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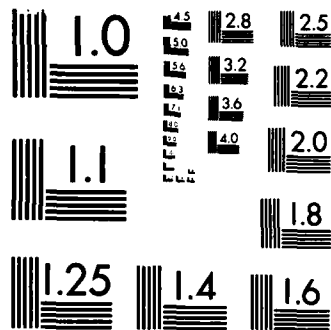
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Wargaming And Its Uses

by

Peter P. Perla
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INTRODUCTION

This paper defines wargaming and briefly discusses its major characteristics and uses in exploring defense issues. It describes the different levels of wargame play and how wargames may be most appropriately employed. It concludes by comparing wargaming to systems and campaign analysis, showing how, despite some similarities of form, campaign analysis and wargaming are distinctly different approaches to addressing defense problems.

WHAT WARGAMING IS AND IS NOT

The term wargaming has been defined in many ways. In its broadest application, it is used to describe any type of warfare modeling, including simulation, campaign and systems analysis, and military exercises. A more restricted and more useful definition is that wargaming is any type of warfare model or simulation, not involving actual military forces, in which the flow of events is affected by decisions made during the course of those events by "players" representing the opposing sides. This definition includes not only the training and research games conducted at the Naval War College (NWC) but also encompasses a much wider variety, from the Global War Game series with its hundreds of participants to small, one- or two-person manual or table-top games and their micro-computer derivatives.

What wargaming is not is often even less obvious than what it is. First and foremost, wargaming is not analysis in the usual sense of rigorous, quantitative, dissection of a problem. Nor is wargaming real, despite the similarities of gaming language and the gaming experience to many aspects of actual operations. A wargame is not duplicable; you cannot refight a game changing only the "random numbers." A wargame is, at heart, an exercise in human interaction, and the interplay of human decisions and the outcomes of those decisions makes it impossible for two games to be the same. As a result of such factors, wargames are not universally applicable to defense problems; the less important human decisions, and the more important physical or technical parameters, the less relevant is wargaming.

THE ELEMENTS OF A WARGAME

A good wargame must be structured to help human players make decisions and to allow them to learn about the effects of those decisions. There are six key elements in such a structure:

- Objectives
- Scenario
- Data base
- Models
- Rules, procedures, umpires
- Players.

A wargame must have a clearly defined and clearly stated set of objectives. In specifying objectives, game sponsors, designers, and analysts must clearly identify how and in what ways the game can provide the type of information needed to achieve those objectives. The objectives should be as specific as possible, to allow the game design to focus on those elements critical to the collection of required information. The definition of objectives should be the principal driver of a wargame's entire structure.

The scenario sets the stage for the game, placing players in the situation with which they must deal. The scenario can have a significant, if not overwhelming, effect on the decisions players are able to make. As a result, the game designer must carefully determine how the scenario may affect the factors he is most interested in exploring. Detailed scenario descriptions should allow the players to understand those factors and how they arose so that they can understand how the underlying assumptions may affect their scope for decisionmaking.

The data base contains the information players may use to help them make decisions. Typically, this information includes forces available, some measure of their capabilities, physical or environmental conditions, and other technical facts. Because of its importance to decisionmaking, the data base must clearly and concisely present the information players would reasonably have available to them in an actual situation, and it must do so in a manner easy for them to use during play.

The fourth element of a wargame is a set of models, usually mathematical expressions, which translate data and decisions into game events. Models must be flexible enough to deal with unforeseen player decisions. They should be designed to allow the data base to change without requiring major changes to the models themselves. Their mechanisms should accurately reflect those factors most important to the decisionmaking levels represented by the players. As much as practicable, the question of whether a model will depend on random numbers should be driven by the underlying

process; just as real battles are affected by chance, game battles should sometimes reflect the role of luck in executing any operation, and analysis should report on those effects.

In addition to models, a game must have a set of rules and procedures, typically monitored in large games by a team of umpires, to define what players can and cannot do and why. These procedures help sequence game events to allow for accurate chains of cause and effect. Game procedures are also responsible for ensuring that players receive the appropriate quantity and quality of information during play and for introducing error and delay to simulate the "fog of war."

Finally, and most importantly, a wargame must have players, whose decisions affect and, in turn, are affected by the flow of events. A game is most effective when the players can be cast in operational roles and given the information and responsibility required to make the decisions appropriate to those roles. Because learning from a game requires understanding why players make decisions, thorough player understanding of game objectives and preparation for their roles is essential to useful game play.

LEVELS OF PLAY

There are many ways of describing the different levels of game play that are most often used. The most useful taxonomy combines the idea of geographic scope and level of warfare. There are three broad classes of games defined in this scheme: Global/Strategic, Theater/Operational, and Local/Tactical.

GLOBAL/STRATEGIC

In Global/Strategic games, the primary decisionmakers represent opposing National Command Authorities, or NCAs. Typically the goals of such games are to improve the perspective of the participants, test strategies, and identify important issues at the global level. These games have usually focused attention on pre-hostilities and transition politics and force deployments, the D-day engagements, and war escalation or termination questions. Their primary output is qualitative, consisting typically of game narratives with some interpretations of events; numerical data is minimal. Games at this scale usually require the commitment of indefinite and large numbers of people and time; they are seldom, if ever, repeated under identical conditions.

THEATER/OPERATIONAL

The primary decisionmakers in Theater/Operational games are typically cast as Commanders-in-Chief (CINCs) of the unified or specified commands in the region. Some games actually combine multiple theaters to achieve a pseudo-global scope. However, because decisions are made at theater level, these games are closer to the operational rather than the strategic scale.

Theater/Operational games are usually designed to explore specific issues and identify strategic, operational and tactical problems in the theater. Often they point out areas in need of further study. Such games focus on the force levels and employment options necessary or feasible for carrying out specific military missions. Although the output of these games is similar in nature to that of Global/Strategic games, there is a tendency to run the game more than once and to generate more numerical data.

LOCAL/TACTICAL

The primary decisionmakers in this final category are generally Battle Group commanders or below. As is the case with the Global/Strategic games, a primary purpose of the lowest level games is to give participants an improved perspective. Local/Tactical games are also used to compare various tactics and forces. Even more than the other types of games, identifying topics for further analysis is an important goal of Local/Tactical games.

Typically, these low level games focus attention on force levels and tactical deployments, weapon and sensor performance and interrelationships among various wargame areas. The outputs of these games usually have a greater balance of qualitative and quantitative results than is the case with the others. The number of iterations of a

Local/Tactical game varies, but does tend to be higher than either of the other two categories.

Table 1 compares the three categories of games defined here.

TABLE 1

LEVELS OF WARGAMES

	Global/Strategic	Theater/Operational	Local/Tactical
Primary decisionmaker	National Command Authority	Commanders-in-Chief	Battle Group or lower
Goals	Give participants a better perspective, test a strategy, identify key issues.	Explore specific issues. Identify strategic, operational and logistical problems in theater. Identify areas for further study.	Give participants a better perspective. Compare various tactics/forces. Identify critical factors and areas for further study.
Focus on	Prehostilities and transition politics and force deployments, the D-day shootout, and escalation/war termination.	Necessary/feasible force levels and employment options for accomplishing specific military missions.	Force levels and tactical deployments, weapon and sensor performance and interrelationships among warfare areas.
Primary output	Qualitative. Narratives and interpretations with little numerical data. Typically only a single game run.	Qualitative. Narratives and interpretations but with some numerical data for more support. Typically a small number of games run.	Balance of qualitative and quantitative results. Number of iterations may vary, but trends to be higher than others.

OTHER CHARACTERISTICS OF WARGAMES

In addition to the level of decisionmaker at which the game is played, wargames may be characterized by:

- The number of players or "sides"
- Instrumentality
- Information limits
- Style.

Most wargames are two-sided, one player or team representing friendly forces and the other the opposition. Often a third, non-player team (control) handles matters outside the scope of the player decision levels and carries out umpire functions. Although the two-sided game is far and away the most frequent type, multi-sided games, with three or more independent active player teams, can be useful for many applications, especially political-military games. One-player games, in which control actually assumes direction of the opposition as well as its usual functions, are frequently employed for training purposes.

In addition to players and umpires, games need some tools to keep track of and display data, force movements, and interactions. In many cases, such tools consist largely of maps, charts, and books of data and orders of battle. Such strictly manual games were once the primary mode of wargaming, but are now being complemented by computers. Computer-assisted games use machines ranging from personal computers to large mainframes to help keep track of force positions and movement, weapons capabilities and other critical data-intensive items. Extrapolating beyond such computer-assisted games are the developments being pursued at places such as the Rand Strategy Assessment Center in which the human decisionmaker is being replaced by computers built around artificial intelligence/expert system concepts. Computer-controlled games of this type are difficult to categorize as true wargames, and they may develop into a new, but related, tool.

Another typical distinction is between "open" and "closed" wargames. An open wargame allows all players essentially free access to all available information (other than the other side's plans). Typically such games use a single situation map on which forces from both sides are, for the most part, openly displayed and force capabilities freely accessed. A closed system introduces limits on information available to players, better simulating the "fog of war." Closed games almost always require some sort of computer assistance unless they are very small in size or scope.

Finally, a wargame's style may be characterized as either seminar games or system games. In a seminar game (typically an open game), opposing players discuss the sequence of moves and countermoves they are likely to make in a given situation, arriving at a mutually reasonable assessment of what interactions are likely to occur.

The control team assesses the results of those interactions and reports back to the players. The process is repeated for each of the "moves" in the game. Usually seminar games use moves of various lengths of real time (time steps) and so tend to resolve different periods of the war at different levels of detail. A system game, which is often a closed one, substitutes a system of highly detailed rules and procedures for the discussion process. Players make their decisions independently and the system runs them against each other to determine the interactions. The Naval Warfare Gaming System, when used in its entirety, is an example of what such system games are like.

THE USE OF WARGAMING

Wargames of all types and all levels are best used to investigate processes, not calculate outcomes. To define the results of wargames only in terms of what happened, not why, in terms of "lessons learned," not "issues raised," is to lose sight of what a game really is and where its main benefits can be found. Wargames can help explore questions of strategy, human behavior and warfighting trends. They are of little use in providing rigorous, quantitative measures to "objectively" prove or disprove technical or tactical theories. Instead they can often provide the kernel of new theories which can be tested with other analytical tools.

Wargaming is most productive when used as an organizing and exploratory tool or as an explanatory device. It seems especially appropriate for exploring the dynamic character of warfare. The design of the game (organizing) and the play and subsequent analysis of the game (exploring) form a loop in which the questions and issues arising from one play can reshape or reorganize the game system itself to make it a more accurate representation of reality.

As an organizing tool, wargaming helps designers and participants tie their thoughts together and gives them a more operational focus. Designing a game requires comprehensive and coherent study and modeling of the interplay of different types of forces, carrying out different kinds of missions, for different sorts of reasons. The successful translation of quantitative and qualitative tactical analysis into an accurate and meaningful game requires a basic understanding of how players interact as they develop different approaches to the problems posed by the game. Finally, it requires an ability to translate that understanding into intelligible and practical procedures so that the players can concentrate on making decisions, not on remembering rules.

As an exploratory tool, wargaming can give analysts and decisionmakers new insights, leading to further investigation of the sources of their beliefs. It forces participants to look at reality from a different angle and can lead to fundamental changes in how they see that reality. If the initial design of a game incorporates well-known critical factors into its models and procedures, the play of the game and the questions and issues it raises can lead to the discovery of other factors whose importance may have been previously unsuspected or undervalued.

By explicitly allowing human decisions, made under the press of time and on the basis of imperfect or incomplete information, to influence the course of events, and by incorporating randomness and "luck," wargaming comes closer than any other form of intellectual exercise to illustrating the dynamics of warfare. By helping its designers, its players, and the consumers of its briefings and written reports to see the impact of these "unquantifiable" factors in concrete terms, a game also helps to illuminate the sources of that dynamism. Gaming provides an opportunity for deeper understanding of the realities of warfare, even if it cannot improve the accuracy of estimates of exchange ratios.

Finally, as an explanatory device, wargames can be very effective at communicating analytical insights to appropriate decisionmakers. Games can illustrate findings and the judgments that underlie them in clear and memorable ways. In addition, decisionmakers involved in such games can provide new insights that can be explored in subsequent analyses. In this sense, wargaming completes the cycle.

The power of a wargame to communicate and convince is, however, a potential source of danger. A wargame can be very effective at building a consensus on the importance of key ideas or factors in the minds of those who participate in it. Wargames attempt to create the illusion of reality, and good games are very successful at it; this can be a powerful and sometimes insidious influence, especially on those who have limited operational experience. There is always a possibility that intentional or unintentional advocacy of particular ideas or programs may falsely color the events and decisions made in a game and lead to self-fulfilling prophecies. The designer of a game has great power to inform or to manipulate. But the players and other involved in the game have the power and responsibility to divine the designer's intentions and to question their validity.

WARGAMING AND ANALYSIS

On the surface, wargaming has much in common with systems or campaign analysis. In all these approaches, scenarios and data bases underlie and structure the research, mathematical models simulate some aspects of reality, and some sorts of rules, procedures, or umpires assure the logical flow of events.

The true value of wargaming lies in its unique ability to illuminate the impact of the human factor in warfare. The nature of the differences between wargaming and systems or campaign analysis rests primarily in three areas — the distinctions between:

- Knowledge and information
- Decision and calculation
- Time and event.

Whereas systems or campaign analysis is a technique for processing information, wargaming is a tool for exploring knowledge, the human interpretation of information. Campaign analyses use information about physical processes to calculate the outcome of physical events (typically in terms of attrition). Wargames focus on the decisions players make, how they are made, and the effects they have. Although in analysis time is just another variable defining an event, in wargaming time should be the critical factor in the decisions which cause an event to occur.

Campaign analyses usually preordain a sequence of events (often just a string of engagements) and calculate the "expected outcome" of those events based on "hard" information about forces and capabilities. If one side is badly beaten, analysts go back through the sequence to determine what changes could result in a more balanced outcome. The old sequence is discarded and replaced by the new. This iterative procedure goes on until the analysts are satisfied that both sides are employing their forces "optimally." Results, usually expressed as or based on expected attrition, are then calculated and reported.

Wargames, on the other hand, afford the players a large measure of control over events through their decisions. Decisions are not based on clear and complete understanding of all the facts, but on how players view those facts through a cloudy and possibly incomplete frame of reference, often distorted by the pressure of time limitations — in other words, the "fog of war." In most cases, a decision once made may not be recalled. Although the immediate results of decisions are often defined by mathematical models similar to those used in campaign analyses, their true impact ripples through all the subsequent game decisions and events. What and how much is lost in wargame engagements and campaigns is far less meaningful than how and why those engagements occurred as they did.

The end result of a classical campaign analysis can look very much like the single play of a wargame. But it is a play in which all decisions are pre-made, poor decisions are

self-correcting, uncertainty eliminated, and chance averaged away. That such analysis has difficulty capturing the dynamic elements of warfare or illuminating new facets of reality not already incorporated into its models should not be surprising. It can provide little insight into why and how a brilliant hunch, an incredible blunder, a bold gamble, or paralyzing indecision can destroy carefully crafted plans or turn ad hoc operations into decisive victories. There are no Chancellorsvilles in campaign analysis.

Wargames, by their very nature, seek to explore precisely those questions campaign analyses ignore, to discover what we don't know we don't know. To do this, however, the ability of a campaign analysis to vary parameter values over a wide spectrum must be sacrificed. A wargame is not a mathematical experiment whose initial conditions can be recreated precisely and varied at will. The fundamental initial conditions of a game — the state of its players' knowledge base — changes with experience of the game and with replacement of individual players.

In the end, systems or campaign analyses too often become viewed as "black boxes" whose main outputs are ultimately attrition results. The main output of a game should not be the *outcome* of the play, but rather interpretations of the *process* by which the outcome occurs. If structured with that goal in mind, wargames are appropriate and effective tools for exploring decision processes.

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